AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (previously presented): An optical information recording medium comprising:

a transparent substrate having a concentric circular guide groove or a spiral guide groove, said guide groove having land portions and groove portions formed thereon; and

a phase change type recording layer on said transparent substrate,

wherein information that indicates a standard recording linear velocity Vr and/or a maximum recording linear velocity Vh is stored on the medium, said stored information being recorded onto said substrate; wherein, while irradiating on land portions or groove portions formed on said guide groove energy enabled to melt the material of said phase change type recording layer and while increasing a linear velocity of said medium and scanning, the linear velocity at which the reflectivity of said optical information recording medium decreases, in comparison to that before the energy is radiated, is defined as uppermost recrystallization linear velocity V; wherein the uppermost recrystallization linear velocity V at the time when a focused semiconductor beam DC irradiates said groove portions or land portions of said guide groove satisfies a relation

$V \geq Vr \times 0.85$ or

$V \geq Vh \times 0.85$.

Claim 2 (previously presented): The optical information recording medium according to claim 1, wherein the uppermost recrystallization linear velocity V satisfies a relation

$Vr \times 0.9 \leq V \leq Vr \times 2.0$ or

$Vh \times 0.9 \leq V \leq Vh \times 2.0$.

Claim 3 (previously presented): The optical information recording medium according to claim 1, wherein said optical information recording medium further stores information that indicates that said optical information recording medium satisfies the relation relating to the uppermost recrystallization linear velocity V.

Claim 4 (original): The optical information recording medium according to claim 1, wherein at the time of crystallizing an entire surface of said phase change type recording layer, an initialization linear velocity Vi satisfies a relation

$Vr \times 0.5 \leq Vi \leq Vr \times 1.6$ or

$Vh \times 0.5 \leq Vi \leq Vh \times 1.6$

Claim 5 (previously presented): The optical information recording medium according to claim 1, wherein a track pitch of said guide groove is between 0.2 and 1.4 μm, and the uppermost recrystallization linear velocity V is between 6 and 24 m/s.

Claim 6 (previously presented): The optical information recording medium according to claim 1, wherein said phase change type recording layer is in a not-recorded status and has generally a cubic lattice crystal structure.

Claim 7 (original): The optical information recording medium according to claim 1, wherein said phase change type recording layer is made from a material that includes a material that satisfies the relation

$Sb_{\chi}Te_{100-\chi}$ (where χ is atomic percentage and $40 \leq \chi \leq 80$).

Claim 8 (original): The optical information recording medium according to claim 7, wherein said phase change type recording layer has at least one element selected from a group consisting of Ga, Ge, Ag, In, Bi, C, N, O, Si, and S, as an additive element.

Claim 9 (original): The optical information recording medium according to claim 1, wherein said phase change type recording layer is made of material that satisfies a relation

$(Ag, Ge)_{\alpha}\ (In, Ga, Bi)_{\beta}\ Sb_{\gamma}Te_{\delta}$,

where (Ag, Ge) means at least one element selected from Ag and Ge, (In, Ga, Bi) means at least one element selected from In, Ga, and Bi, α, β, γ, and δ represent atomic percentages and satisfy the relation

$0.1 \leq \alpha \leq 7$,

$1 \leq \beta \leq 15$,

$61 \leq \gamma \leq 85$, and

$20 \leq \delta \leq 30$.

Claim 10 (original): The optical information recording medium according to claim 1, wherein under recording conditions such that

when n represents an integer equal to or higher than 1, and T represents a clock time corresponding to a period of a clock used for modulating a signal, a recording beam at the time of recording

or rewriting a 0 signal having a signal width $n \times T$ after modulation is a continuous beam having a power level e,

a pulse string of a recording beam at the time of recording or rewriting a 1 signal having a signal width $n \times T$ after modulation is a laser wave pulse string that has a pulse portion fp having a time width x and a power level a, a multi-pulse portion mp in which a low-level pulse of a power level b having a time width T in total and a high-level pulse having a power level c alternately appear and continue by $(n - n')$ times in total at a duty ratio y, and a pulse portion ep having a time width z and a power level d, and

the time width x, duty ratio y, and the time width z satisfy relations $T \times 0.125 \leq x \leq T \times 2.0$, $0.125 \leq y \leq 0.875$, and $T \times 0.125 \leq z \leq T$, and the power levels a b, c, d, and e satisfy a relation a & c > e > b & d, then

a first protection layer, said phase change type recording layer, a second protection layer, a reflection layer, and a resin layer are formed on said transparent substrate in such a manner that the thickness of each layer makes it possible to record at a higher speed than the standard recording linear velocity Vr or the maximum recording linear velocity Vh.

Claim 11 (original): The optical information recording medium according to claim 1, wherein said optical information recording medium has a multilayer structure with at least a first protection layer, said phase change type recording layer, a second protection layer, a third protection layer, a reflection layer, and a resin layer stacked in order on said transparent substrate.

Claim 12 (original): The optical information recording medium according to claim 11, wherein a material constituting said third protection layer is formed by DC sputtering.

Claim 13 (previously presented): The optical information recording medium according to claim 11, wherein a material constituting said third protection layer includes at least one substance selected from a group consisting of C, Si, SiC, SiN, SiO, and SiO_2.

Claim 14 (previously presented): The optical information recording medium according to claim 1, wherein a linear velocity when crystallizing an entire surface of said phase change type recording layer is slower than the uppermost recrystallization linear velocity V.

Claims 15 - 16 (cancelled)

Claim 17 (previously presented): The optical information recording medium according to claim 1, wherein said recording layer is made from a phase change recording material that changes between an amorphous state and a crystalline state based on irradiation of an electromagnetic beam, and wherein

the phase change recording material includes at least one element selected from Ag, In, Sb, and Te, and a bond coordination number of the selected element/s is different between an amorphous state after a film formation and a crystalline state after an initialization and after an information erasing.

Claim 18 (original): The optical information recording medium according to claim 17, wherein among the constituent elements of the phase change recording material, a bond coordination number of Ag and In with respect to Te in the crystalline state is larger than a bond coordination number of Ag and In with respect to Te in the amorphous state.

Claim 19 (original): The optical information recording medium according to claim 17, wherein among the constituent elements of the phase change recording material, a bond coordination number of Ag with respect to Te in the amorphous state is between 1.5 and 2.5, and a bond coordination number of Ag with respect to Te in the crystalline state is between 3.5 and 4.5.

Claim 20 (original): The optical information recording medium according to claim 17, wherein among the constituent elements of the phase change recording material, a bond coordination number of In with respect to Te in the amorphous state is between 3.0 and 3.8, and a bond coordination number of In with respect to Te in the crystalline state is between 3.4 and 4.2.

Claim 21 (original): The optical information recording medium according to claim 17, wherein among the constituent elements of the phase change recording material, a bond coordination number of Sb with respect to Te in the crystalline state is smaller than a bond coordination number of Sb with respect to Te in the amorphous state.

Claim 22 (original): The optical information recording medium according to claim 21, wherein among the constituent elements of

the phase change recording material, a bond coordination number of Sb with respect to Te in the amorphous state is between 2.7 and 3.5, and a bond coordination number of Sb with respect to Te in the crystalline state is between 2.0 and 2.8.

Claim 23 (original): The optical information recording medium according to claim 17, wherein the phase change recording material has an NaCl type structure in the crystalline state.

Claim 24 (original): The optical information recording medium according to claim 23, wherein among the constituent elements of the phase change recording material, Cl site in the NaCl type structure occupied by Te has a large number of holes.

Claim 25 (original): The optical information recording medium according to claim 24, wherein among the constituent elements of the phase change recording material, Cl site the NaCl type structure to be occupied by Te has holes between 7/12 and 9/12.

Claim 26 (cancelled)

Claim 27 (previously presented): The optical information recording medium according to claim 1,

wherein said substrate is disk-shaped and

wherein said phase change type recording layer is stacked on said substrate, is made from material which includes Ge, Ga, Sb, and Te, and when α, β, γ, and δ represent atomic percentages of Ge, Ga, Sb, and Te, and $\alpha + \beta + \gamma + \delta = 100$, then α, β, γ, and δ satisfy the relations

$0.1 \leq \alpha \leq 7$,

$1 \le \beta \le 9$,

$61 \le \gamma \le 75$,

$22 \le \delta \le 30$.

Claim 28 (original): The optical information recording medium according to claim 27, wherein said phase change type recording layer has been added with at least one element selected from a group consisting of In, Zn, Sn, Si, Pb, Co, Cr, Cu, Ag, Au, Pd, Pt, S, Se, Ta, Nb, V, Bi, Zr, Ti, Al, Mn, Mo, Rh, C, N, and O.

Claim 29 (original): The optical information recording medium according to claim 27, wherein a composition ratio of Ge and Ga is $-8 \le \alpha - \beta \le 3$.

Claim 30 (original): The optical information recording medium according to claim 27, wherein a composition ratio of Sb and Te is $\gamma + \delta \ge 88$.

Claim 31 (original): The optical information recording medium according to claim 27, wherein

the optical information recording medium is applied with an information recording/reproducing method for recording, reproducing and rewriting information onto/from the optical information recording medium, by generating a phase change in a recording layer of the optical information recording medium based on irradiation of a laser beam onto the optical information recording medium, and

it is made possible to execute a multi-speed recording and/or a CAV recording onto the optical information recording medium, based on an arrangement that

in the case of recording information onto an information recording medium by modulating a signal according to a PWM recording system, a recording wave at the time of recording or rewriting a 0 signal having a signal width $n \times T$, where T is a clock time, after modulation is a continuous beam having a power level e, and

a recording wave pulse string at the time of recording or rewriting a 1 signal having a signal width nT after modulation is an electromagnetic wave pulse string that has a pulse portion fp having a time width x and a power level a, a multi-pulse portion mp in which a low-level pulse of a power level b having a time width T in total and a high-level pulse having a power level c alternately continue by (n - n') times in total at a duty ratio y, and a pulse portion op having a time width z and a power level d, where the time width x, duty ratio y, and the time width z satisfy relations $T \times 0.5 \leq x \leq T \times 2.0$, $0.125 \leq y \leq 0.875$, and $T \times 0.125 \leq z \leq T$, where n' is a positive integer equal to or greater than n, and the power levels a b, c, d, and e satisfy a relation a & c ≥ e ≥ b & d.

Claim 32 (original): The optical information recording medium according to claim 31, wherein a duty ratio of the pulse portion mp increases or decreases according to a recording linear velocity.

Claim 33 (new): An optical information recording medium comprising:

a transparent substrate having a concentric circular guide groove or a spiral guide groove, said guide groove having land portions and groove portions formed thereon; and

a phase change type recording layer over said transparent substrate, said recording layer being crystallized by initializing with laser radiation;

wherein information that indicates a standard recording linear velocity Vr and/or a maximum recording linear velocity Vh is stored on the medium, said stored information being recorded onto said substrate;

wherein, while irradiating land portions or groove portions formed on said guide groove with energy to melt the material of said phase change type recording layer and while increasing a linear velocity of said medium and scanning said land portions or groove portions formed on said guide groove with said energy, the linear velocity at which the reflectivity of said optical information recording medium decreases, in comparison to that before said irradiating with said energy, is defined as uppermost recrystallization linear velocity V; and

wherein the uppermost recrystallization linear velocity V at a time when a focused semiconductor laser beam DC irradiates said groove portions or land portions of said guide groove satisfies a relation

$V \geq Vr \times 0.85$ or

$V \geq Vh \times 0.85$.

Claim 34 (new): An optical information recording medium as in claim 33, wherein said substrate has a thickness of approximately 1.2 mm, and said guide groove has a width between 0.25 and 0.65 micrometers and a depth between 25 and 65 nanometers.

Claim 35 (new): An optical information recording medium as in claim 33, wherein said guide groove has a width between 0.30 and 0.55 micrometers and a depth between 30 and 55 nanometers.

Claim 36 (new): An optical information recording medium as in claim 33 wherein said substrate has a thickness of approximately 0.6 mm adhered to another substrate to form a disc having a thickness between 1.1 and 1.3 mm, and said guide groove has a width between 0.10 and 0.40 micrometers and a depth between 15 and 65 nanometers.

Claim 37 (new): An optical information recording medium as in claim 33, wherein said guide groove has a width between 0.15 and 0.30 micrometers and a depth between 25 and 50 nanometers.

Claim 38 (new): An optical information recording medium as in claim 33 in which the medium is a DVD disc.